CO2Meter.com
CO2 Measurement Specialists

DATA ACQUISITION SYSTEM (DAS)

Software User Manual

CO2Meter.com

Description

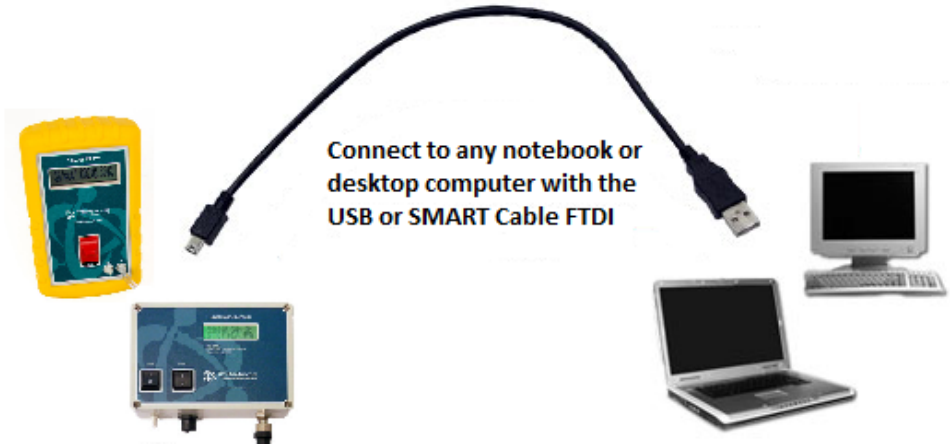
DAS; CO2 Meter's own in-house developed, data acquisition software. DAS can be used to configure and calibrate sensors, collect data, view data in real-time, and manage stored logs on sensors with onboard storage.

Welcome

Thank you for downloading our DAS software and for purchasing our data logger. Our data acquisition software is designed to facilitate your data gathering process and to help you analyze and manage your data. This software is free and it updates automatically when you launch the program.

Please read the manual carefully to get familiarized with how this software operates so you can take full advantage of this useful tool.

Visit our website CO2Meter.com regularly to check for updates. You can also use the "Check for updates" function under the *Help* menu.



***** IMPORTANT *****

Follow this format to ensure proper set up:

1. **Start by downloading the DAS Software to your computer**
2. **Power the meter using Batteries or the included International Power Supply**
   NOTE: the USB cable will not supply the proper power
3. **Turn the meter ON**
4. **For LCD display only, after connecting the USB from the meter to the computer, visually confirm the meter has reset. (The screen will change in color from grey to blue, then back to grey)**

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Program Features

- ✓ Auto-detection of Meters - No manual driver installations or COM port selection required. Simply plug your meter into the computer and wait for the DAS software to automatically recognize the meter.
- ✓ Report and Export Features - Print customizable reports formatted using standard HTML or export data in industry-standard comma-separated values (.csv) for importing into Microsoft Excel or other statistical analysis packages.
- ✓ Automatic Updates - The DAS software will automatically be updated to the latest software when launched. Continuously receive new features!
- ✓ Real-time Data Collection - Collect data with graphical display in real-time from attached meters in addition to being able to download logs from meters that support non-tethered data collection.
- ✓ Quantity of data points that can handle comfortably, depending on computer capacity.

List of Compatible Products

- ➢ Data Loggers
- ➢ Sampling Data-loggers
- ➢ Sample Draws
- ➢ Development Kit
- ➢ Probes
- ➢ Transmitters
- ➢ iSense NEMA Meters

Minimum System Requirements

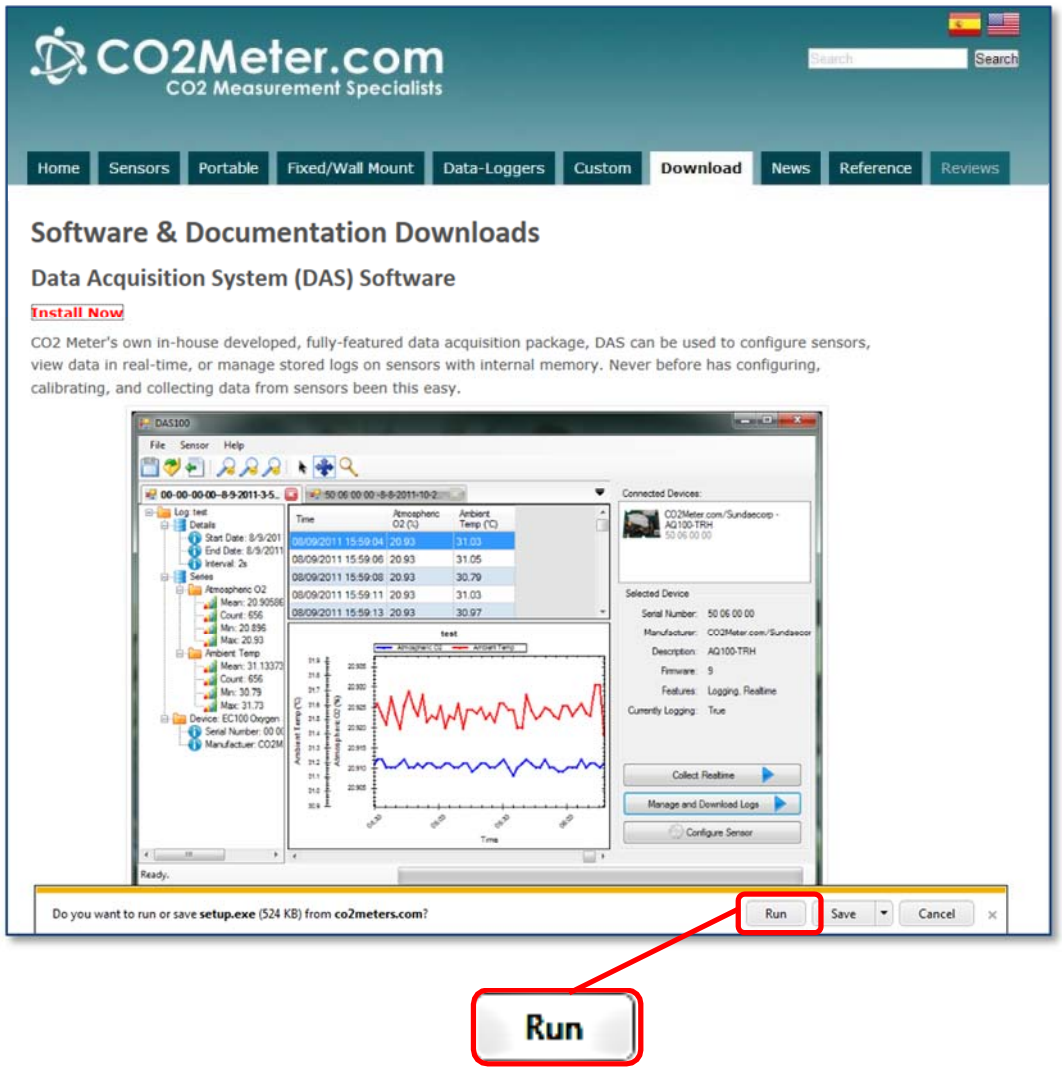
- Windows XP SP3 or higher, Windows 7 and Windows 8
- On Intel based Macs, the software can be run on a Windows 7 or Windows 8 Virtual machine using VM Ware Fusion.
- Microsoft .Net Framework 4.5 SP1
- Pentium 4 (or newer) operating at 2.4Ghz or higher
- 1GB of Random Access Memory (RAM)
- Hard disk space with at least 20MB free (200+MB recommended for logs and application files)

Installation

This section describes the procedures involved in the installation of the DAS software on a computer running Microsoft Windows XP with Service Pack 3 or later. Installation on Windows 7, Windows 8 or Macs is very similar.

Instructions

1. Go to the website http://www.co2meter.com/pages/downloads, scroll down to DAS: Data Acquisition Software, and click on the "**Install DAS Software**" link to install the program.
2. When prompted, click on the "Run" button as shown on the image below (Internet Explorer 9). Please note that if you click on the "Save" button, the operating system might not prompt you to install the program.



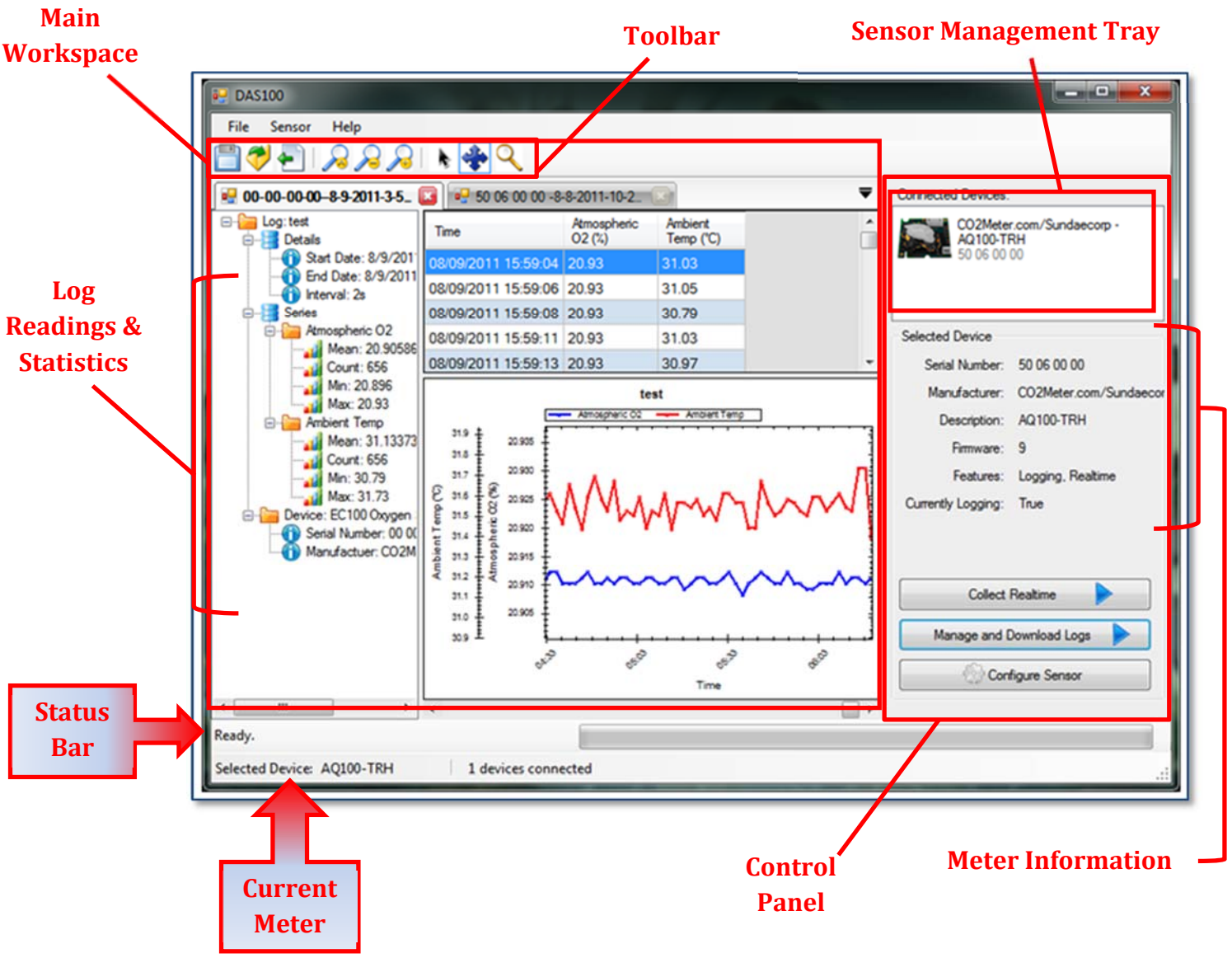
3. Follow the on-screen instructions and prompts to complete the installation process.

Note: We strongly recommend letting DAS install drivers for your meter automatically.

Read through these instructions in its entirety before using the software. In addition, read through your specific meter's user manual before use. For a quick start video tutorial, visit https://www.youtube.com/watch?v=JTDPTmquwUQ

DAS Interface

The DAS interface is user friendly and makes the whole experience very straightforward. The image below shows a description of the user interface in general terms. The *Sensor Management Tray* lists all the sensors currently connected to the computer. The *Log Readings & Statistics* section provides live data and feedback from the sensor.



The *Toolbar* provides tools to have easy access to actions and commands. The *Main Workspace* provides graphically displays it in real time. The *Meters Information* section displays the description, serial number and details. The *Control Panel* is used to program, calibrate, download and collect real-time from the meter.

Toolbar

The easy-to-use large icons toolbar contains features that are common among other Windows-based programs such as *Save*, *Open*, *Move* and *Zoom Box*. Other easily accessed features include *Export to CSV* (for Microsoft Excel) and other Zoom and Scale features as shown below.

Save Open Export (csv) Auto Scale Zoom Out Zoom In Cursor Move Zoom Box

Save: To save the changes and current data on the Main Workspace
Open: Access to the DAS logs filed / saved data
Export: Transfer the Graph Data to a spread sheet on Excel
Auto Scale: Compress the view of the graphic
Zoom In/Out: Allows you to increase or decrease the size of the graph
Cursor: To navigate and select specific values in the graph
Move: Move the entire graph
Zoom Box: allow you to enhance a specific area that you choose

Connecting Meters

The first time the meter is connected to your computer, the operating system will install the necessary USB drivers as shown in ***Figure 1.*** This process could take a few minutes while Windows install the necessary drivers.

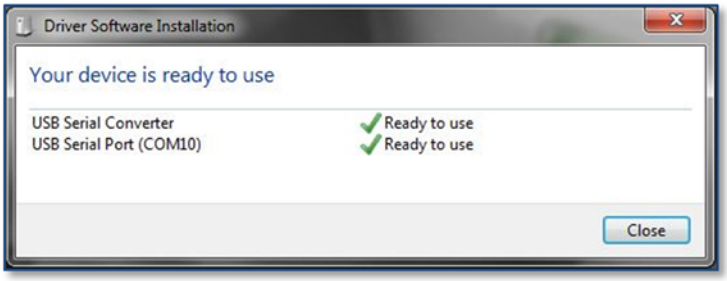


Figure 1: USB Driver Installation.

***** IMPORTANT *****

Follow this format to ensure proper set up:

1. **Start by downloading the DAS Software to your computer**
2. **Power the meter using Batteries or the included International Power Supply**
   NOTE: the USB cable will not supply the proper power
3. **Turn the meter ON**
4. **For LCD display only, after connecting the USB from the meter to the computer, visually confirm the meter has reset. (The screen will change in color from grey to blue, then back to grey)**

Connecting Meters (continued)

Once all the drivers are installed properly and the software is launched, DAS automatically detects any of the supported CO2Meter.com products and displays them in the *Sensor Management Tray* as shown in ***Figure 2***. If this process doesn't launch automatically when you connect the meter to your computer, please contact us for support.

When the meter has been detected, you can start collecting real-time data or downloading saved logs by selecting the meter in the *Sensor Management Tray*, and clicking the appropriate button. For meters that do not have onboard storage, the *Manage and Download Logs* feature will not be available. For more information on managing logs, see the *Downloading Logs* section in the manual.

Renaming the Meter

Upon detection, DAS will ask you to give the meter a name or an alias as shown in ***Figure 3.*** This is useful when you have more than one meter, such as multiple data loggers, and need to distinguish between them. *NOTE:* this will be the only opportunity that you'll have to change the alias.

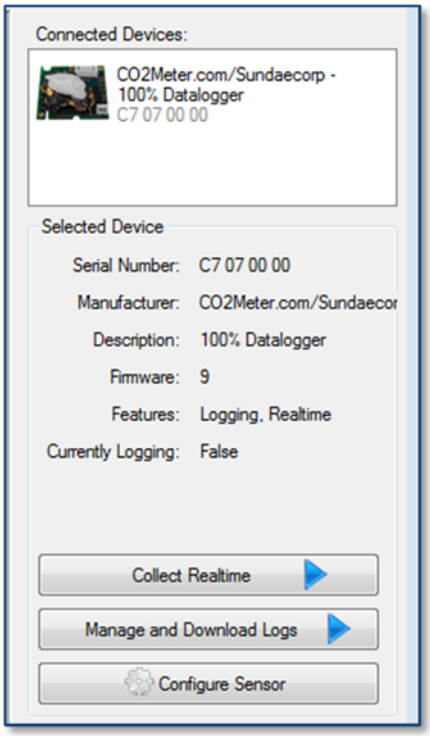


Figure 2: Meter control panel

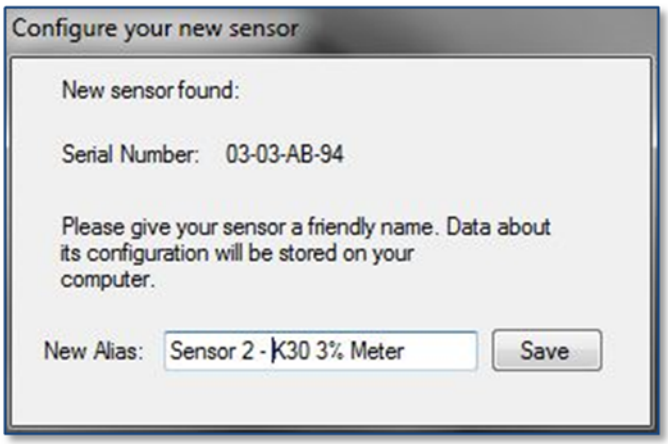


Figure 3: New Sensor Found

Configuring the Meter

The meter(s) will be shown in the *Connected Meters - Sensor Management Tray*. Select the sensor to be configured, and then click on the *CONFIGURE SENSOR* button on the bottom right section of the window. Select the desired tab to configure the meter as needed.

Configuration ("Config") Tab

On this tab, you will be able to configure the meter's general functions. Typical options include LED Display Thresholds, Optional Buzzer, and Battery Saver Mode as shown in ***Figure 4.***
NOTE: These options may vary depending on the meter type.

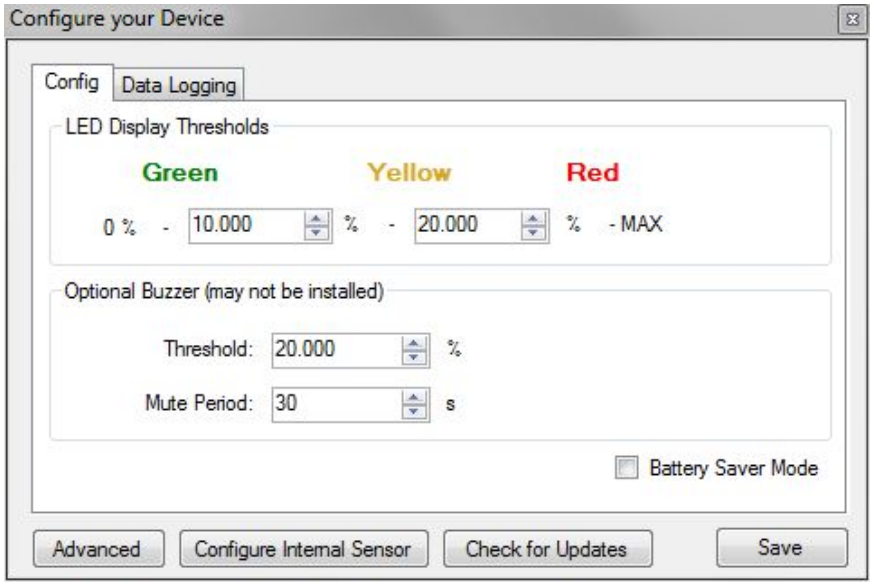


Figure 4: Meter Configuration options.

- **LED Display Thresholds**

  The meter allows for customization of the LCD (Liquid Crystal Display) back-lit display providing a visual indication of the current CO2 conditions. The display will change color depending on the actual level readings by setting the "Green", "Yellow", and "Red" ranges. In the example shown on **Figure 4**, the "Green" LED color will be displayed if the CO2 level readings are below 10% of the meter's measuring range, the "Yellow" LED color will be displayed if the CO2 level readings are between 10% and 20% of the meter's measuring range, and the "Red" LED color will be displayed if the CO2 level readings are above 20% of the meter's measuring range (up to the maximum meter's measuring range).
  NOTE: If the meter reads in ppm, ignore the % symbols and just add the specific values in ppm.

- **Optional Buzzer**

  Some of meters will include an alarm buzzer. This section allows you to customize the buzzer's characteristics. The ***Threshold*** is basically the CO2 level at which the buzzer will sound due to an alarm. The ***Mute Period*** sets the amount of time the buzzer will be in silent mode after the "Mute" button on the meter have been depressed.
  NOTE: If the meter reads in ppm, ignore the % symbols and just add the specific values in ppm.

- **Battery Saver Mode**

  Selecting this checkbox will put the meter in ***Battery Saver Mode***. This will assist in saving a significant amount of power. This mode will actually disable the meter's pump regardless of the

Pump Mode option selected. This mode will also dim the LCD display when no buttons are pressed for 1 minute or more.

Advanced Options

This option allows advanced users or CO2Meter technicians to access the internal sensor(s) in your meter and modify its characteristics, functions and firmware. WE STRONGLY RECOMMEND NOT MAKING ANY CHANGES TO THESE SETTINGS TO PREVENT VOIDING THE METER'S WARRANTY. If you need to access the internal sensor settings, please contact us to discuss your options and provide you with a service password.

Configure Internal Sensor

This button allows access to Outputs, ABC/Frac/Calibration and Sensor Information. Proceed carefully when changing any parameters that will affect the functionality of the sensor. For example, the MODBUS address should always be 100. For further detail and explanation, consult the User Manual of the meter.

Check for Updates

To *CHECK FOR UPDATES* used either the button as shown in ***Figure 4*** or the drop down in the Help section as shown in ***Figure 5***. This will check your current version of DAS software to confirm the latest updated version of the software. If updates are found, you will be prompted to install these updates. WE STRONGLY RECOMMEND KEEPING YOUR SOFTWARE UP-TO-DATE TO ASSURE YOU HAVE THE LATEST DRIVERS FOR THE METER(S). If updates are not found, no action is required.

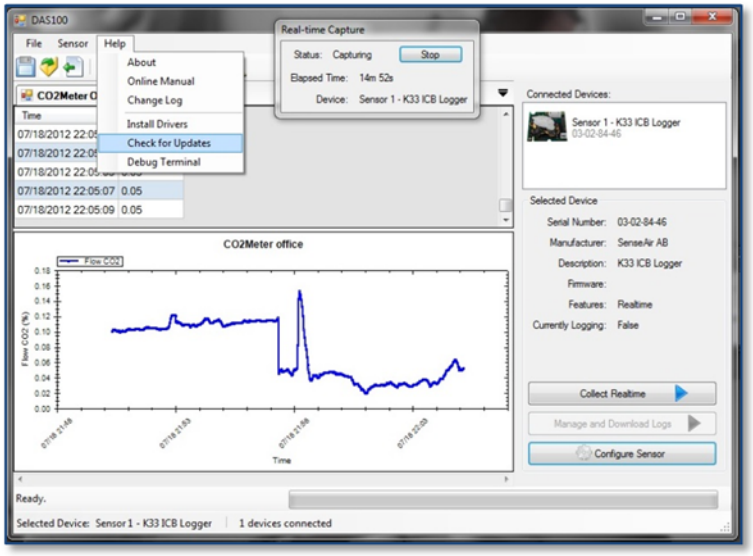


Figure 5: Check for DAS Updates.

Data Logging Tab

The ***DATA LOGGING TAB*** allows for configuring the meter's logging characteristics and options. ***Figure 6*** shows the typical options that you can configure to customize the meter for your specific needs:

- **Log Interval** – This field will control the period of time between data samples in seconds.
- **Pump PWM –** Pulse-Width Modulation (PWM) is a mean to define the power delivery to the pump and audible alarm. THIS FIELD SHOULD BE CHANGED BY EXPERIENCED USERS ONLY TO AVOID PUMP OR ALARM MALFUNCTION.
  NOTE: 1=Stronger suction 0.450 L/min(pump)and 80dB (alarm)
- **Pump Period** – This field will control the amount of time the pump will be active before sampling.
- **Wait Period** – This field will control the amount of time the meter will wait before taking a sample, after completing a pump period.
- **Integration Period** – This field will control the amount of time the meter will wait before displaying the actual reading.
- **Pump Mode** – This field lets you select between different operational presets of the pump. ***Figure 6*** shows the different options available.
  - **Disabled**: pump doesn't run at all.
  - **Data logging Coupled, Run during Sample**: pump runs while sample is being taken only.
  - **Data logging Couples, Run before Sample**: pump runs before meter takes a sample and then stops while sample is being taken.
  - **Continuously on**: pump runs all the time.

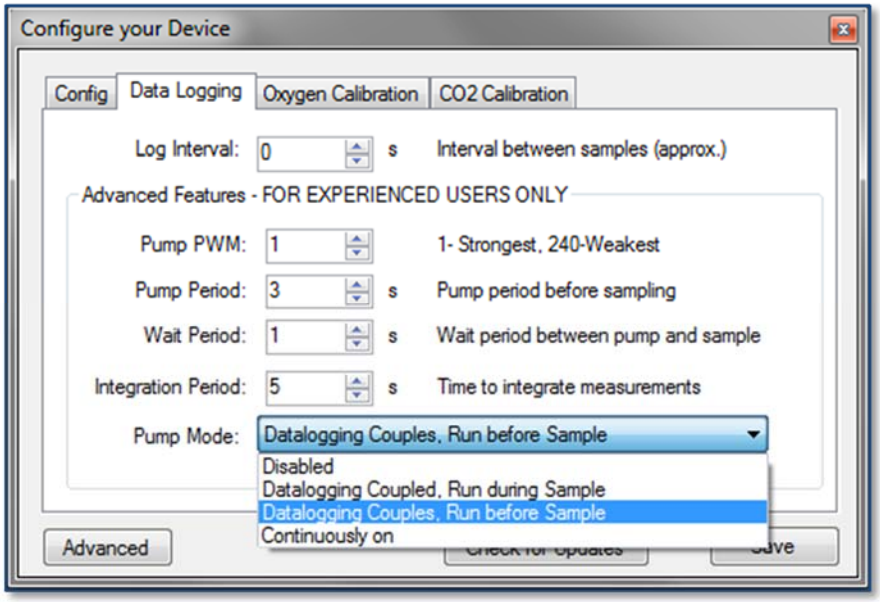


Figure 6: Data logging option, Alarm & Pump Mode options.

Oxygen Calibration Tab (If applicable – refer to User Manual for complete details)

- **Zero Calibrate** – use this option if the meter needs to be recalibrated to zero. Make sure to use a calibration gas bottle/cylinder (100% nitrogen or argon) with the appropriate demand regulator.
- **Span Calibrate** – use this option for periodic calibration to ensure measurement accuracy for years to come.

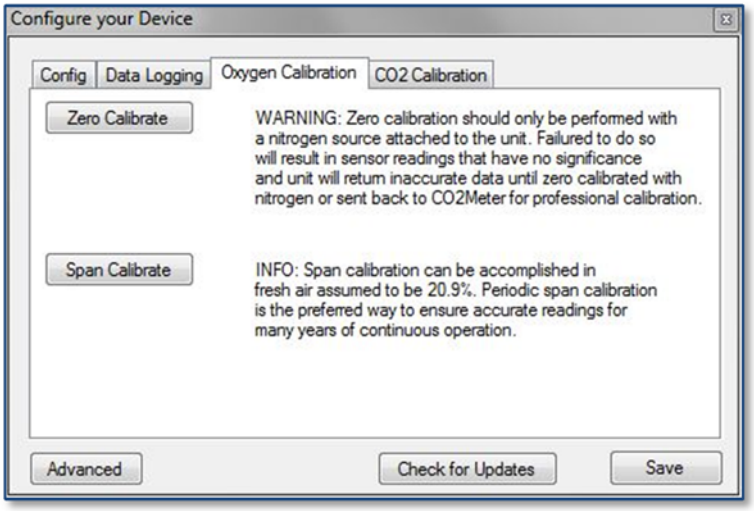


Figure 7: Oxygen Calibration options.

CO2 Calibration Tab (If applicable – refer to User Manual for complete details)

Use this option to calibrate the carbon dioxide (CO2) sensor in the meter. The calibration window may differ depending on the sensor and meter. ***Figures 8 through 12*** display the different ways and options to calibrate a variety of meters. Select the desired calibration percentage and click on the ***CALIBRATE*** button.

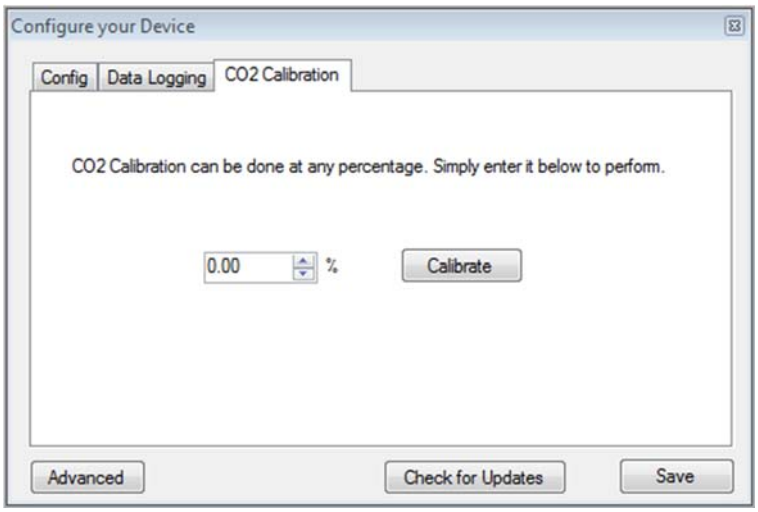


Figure 8: GSS sensor Calibration option.

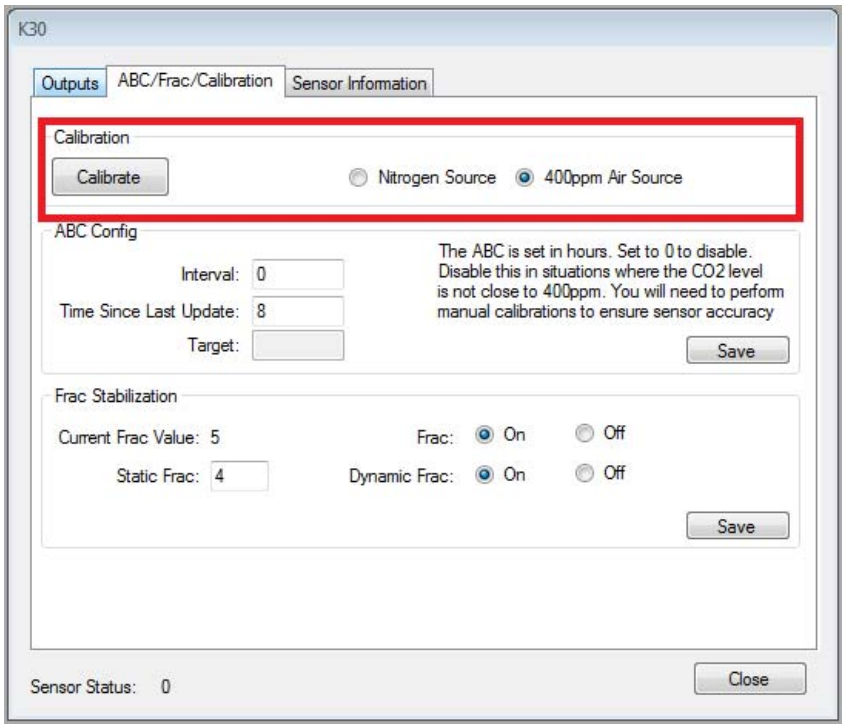


Figure 9: K30 Sensor Calibration option.

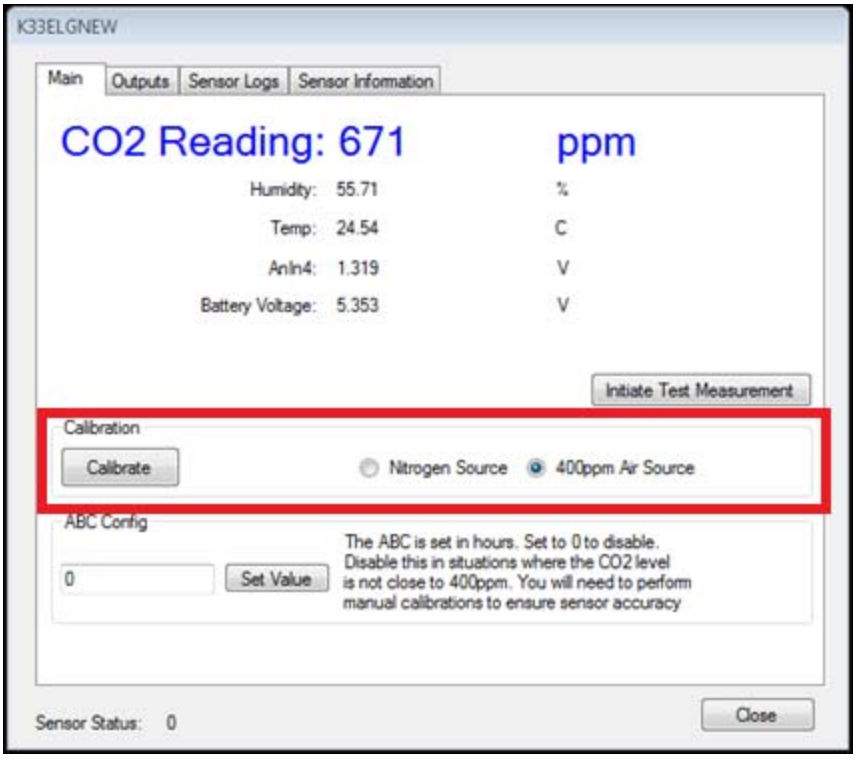


Figure 10: K33 ELG Calibration option.

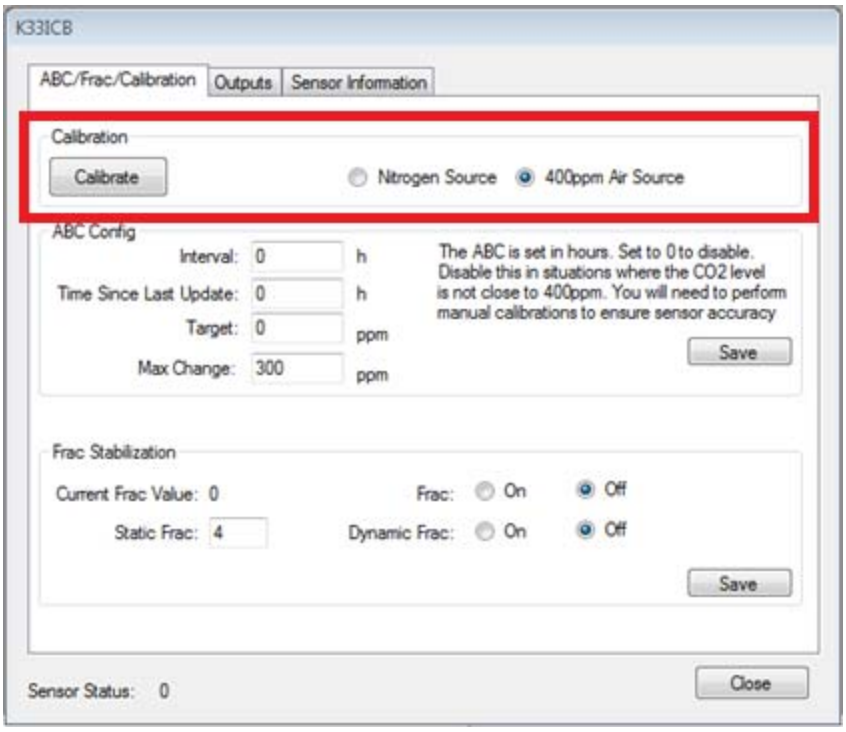


Figure 11: K33 ICB Calibration option.

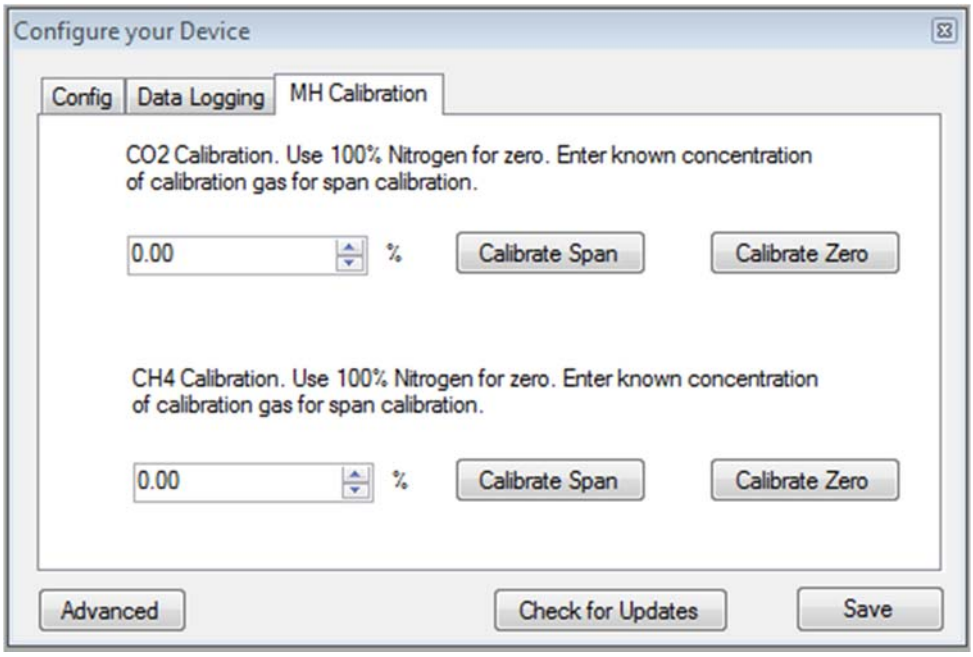


Figure 12: Win-Sen Sensor Calibration options.

Collecting Data

Once the DAS software has been installed and the meter is connected to the computer, you can gather data in a variety of ways. Depending on the type of meter, data can be collected in real time, data logs can be downloaded from the meter's memory (if equipped), and saved to the computer, and data can be reviewed on the meter's LCD display (if equipped).

NOTE: Refer to your meter's User Manual for logging instructions.

Collect Real-time

Once you have opened the DAS software and connected the meter to the computer, you can start collecting data in real time. Simply click on the ***COLLECT REAL TIME*** button on the control panel of the DAS software interface. Select the measurement required, enter a title for the data plot, set the time interval as desired to graph the values (see NOTE below), and click on the ***SELECT FILE AND START*** button found in the bottom right corner of the window, as shown on ***Figure 13***. *NOTE*: The logging interval of the meter is different than the logging interval in DAS. To prevent repeat readings/information on the graph, synchronize the meter's logging intervals with the DAS logging intervals.

Save the working file in the desired location using a meaningful filename. We recommend using the default file name structure SN-##-##-## -- MM-DD-YYYY-HH-MM-SS-AM/PM (meter serial number, followed by the month, day, year, hour, minute, second, and AM/PM, respectively) as shown on ***Figure 14***. Real time capture will begin. Press the ***STOP*** button when complete as shown on ***Figure 15.***

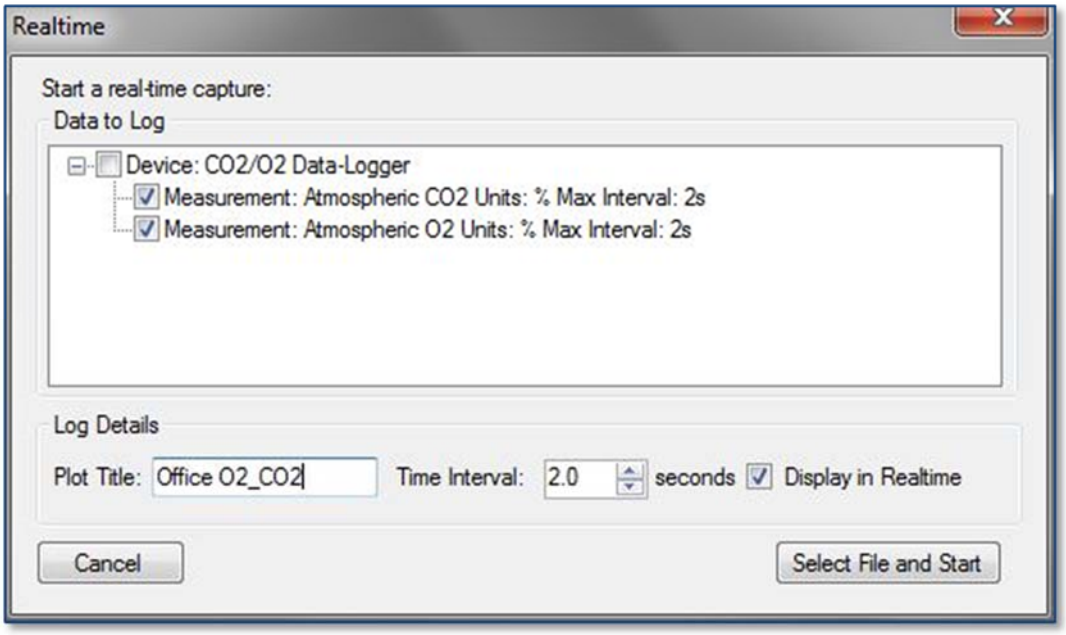


Figure 13: Start Real-time Plot Title.

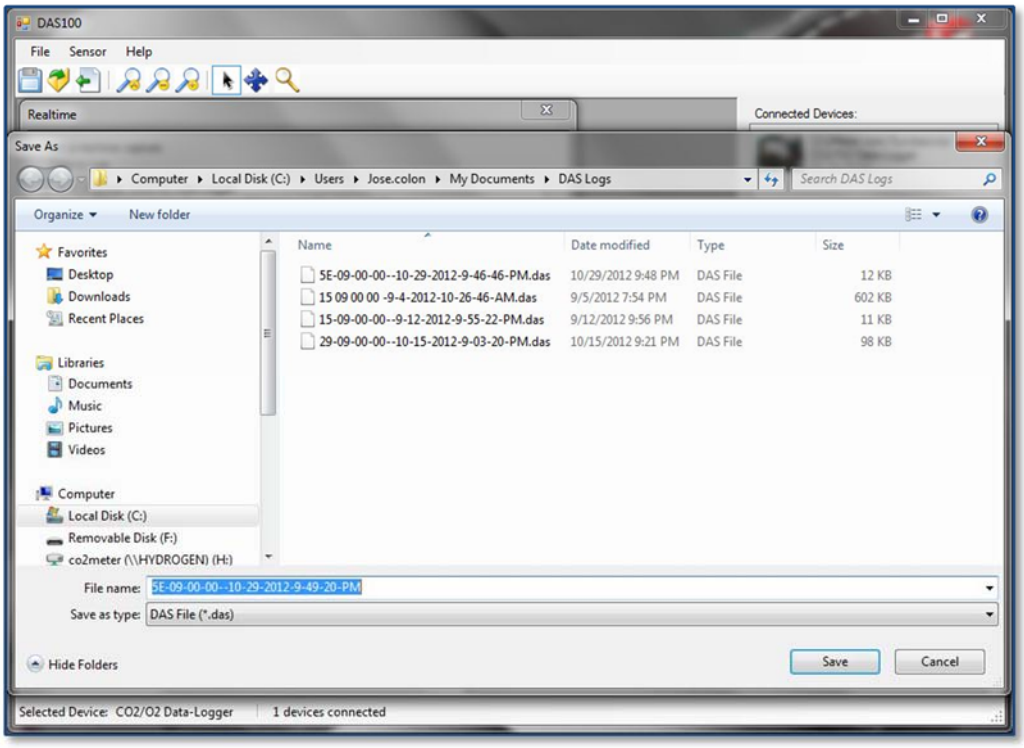


Figure 14: Select File and Start

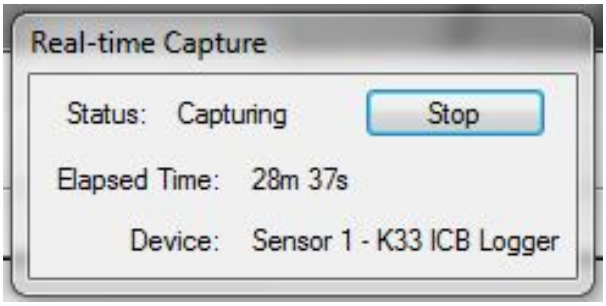


Figure 15: Start Real-time Capture Status

Plotting Data

Our DAS software also allows you to plot the data being collected (real-time) or already saved into a convenient, user-friendly and easily-customizable graph.

Display Graph

The graph displayed on the lower section of the main workspace of the DAS software as shown in ***Figure 16*** displays the real-time data points in a suitable scale. This graph can display data points for one or more measured gases simultaneously, in different color series, with independent scales on the left-hand side of the graph. This graph can be customized as desired as detailed in the following section.

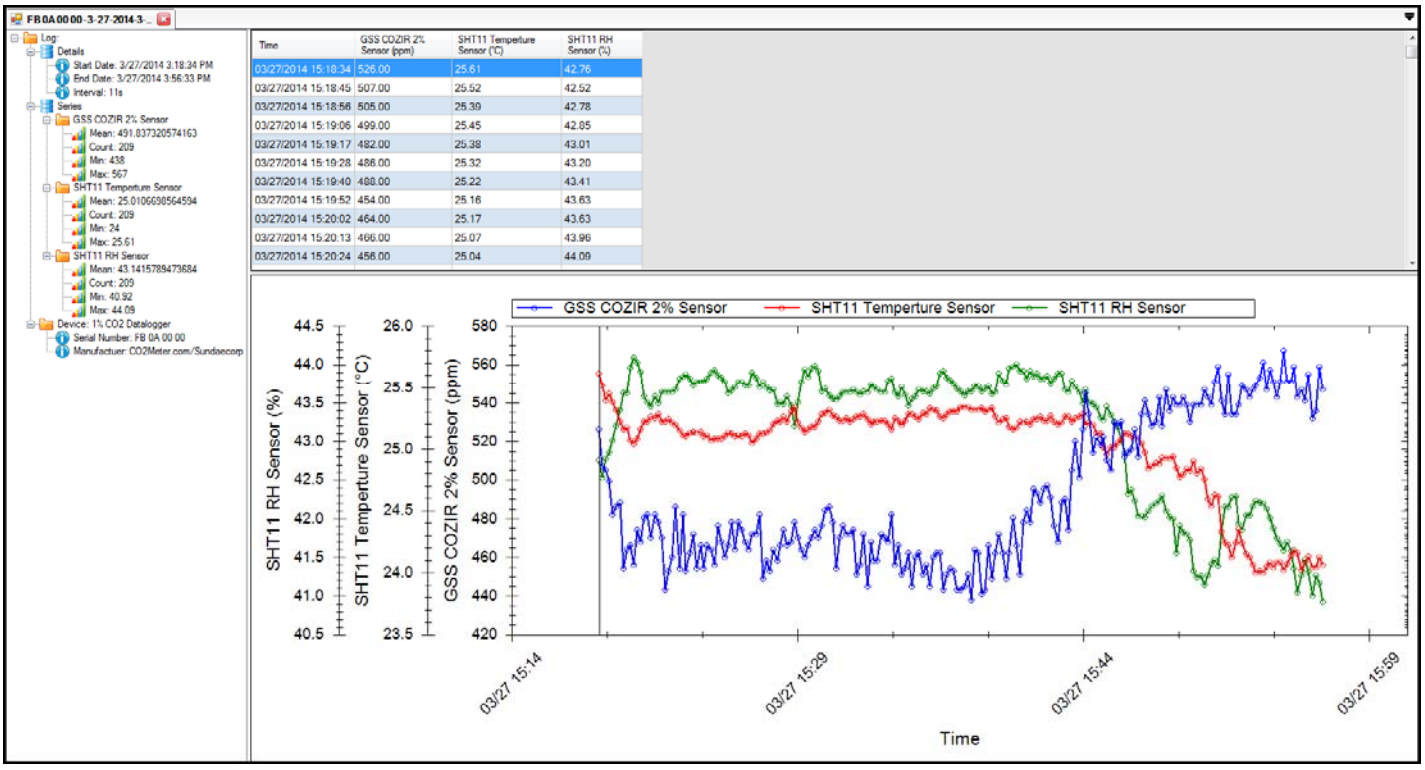


Figure 16: Example of Typical CO2/O2 graph

Customize Graph

As mentioned in the previous section, the graph can be customized to fit your preferences. The customizable aspects include the series properties, the axis properties, and the data points properties.

Customizing Series Properties

To modify the series properties, double click on the legend of the desired series as shown in ***Figure 17***.

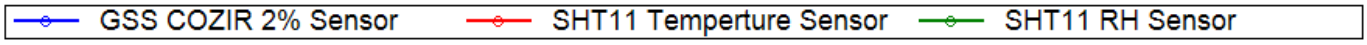


Figure 17: Legend

The series properties window will pop up as shown on ***Figure*** allowing you to modify the following properties:

- Series name: simply type the name you want to assign to the selected series.
- Series color: select the desired color for the data points from the drop down menu.
- Series symbol: select the desired symbol for the data points along with the symbol size from the drop down menus.
- Connection line: select the style and the size (width) of the connection line from the last two drop down menus found at the bottom of the window.
- Visibility: make the series visible by checking the ***VISIBILITY CHECK BOX*** on the bottom right corner of the window.

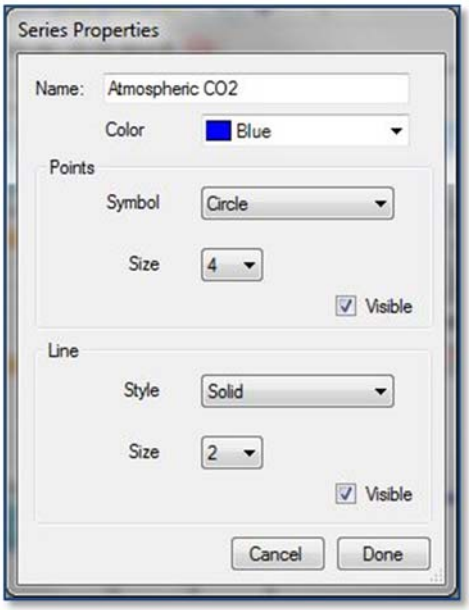


Figure 18: Example of Series Properties - CO2

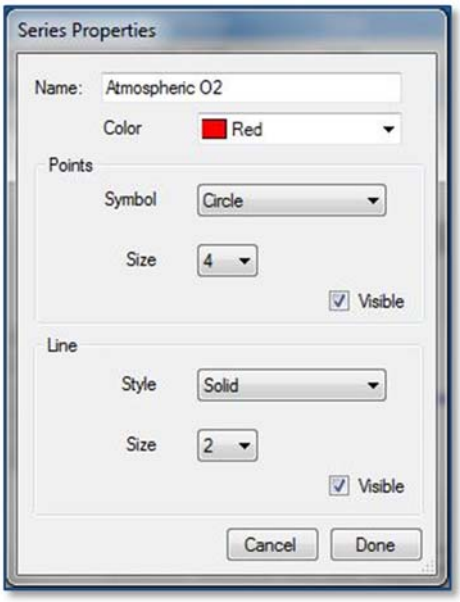


Figure 19: Example of Series Properties - O2

Customizing Axis Properties

The axis properties refer to the gas concentration level scales, which can be specified manually or left in its default state of "Auto Scale Meters". In order to customize these properties, double click on the scales and/or legend or the data points and select the desired format and options from the pop up window as shown in ***Figures 20, 21 and 22***, below. This will allow modification to the following properties:

- Axis name: simply type the name you want to assign to the selected axis.

- Scale: select between "Auto Scale Meters" or "Manually Set".
  - The auto scale option will dynamically update the scale to the varying range of gas concentration level data in order to fit all the data points during real time data collection.
  - If you select to set the scale manually, the scale will be fixed to the range selected and will not update automatically. When selecting to manually set the scale, the following aspects of the axis can be set:
    - Lower Endpoint – minimum value limit
    - Upper Endpoint – maximum value limit
    - Major Interval – scale major meter
    - Minor Interval – scale minor meter

- Axis location: select between left or right axis locations. This option will place the selected axis on the left or right side of the graph as shown on ***Figure 20***.

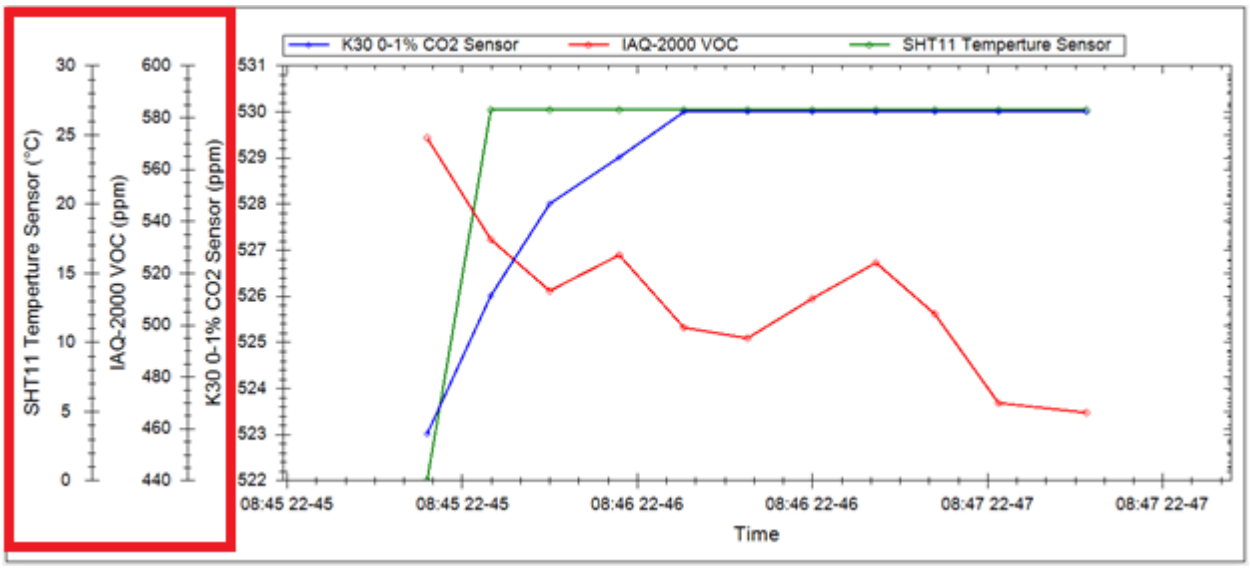


Figure 20: Left Axis Location

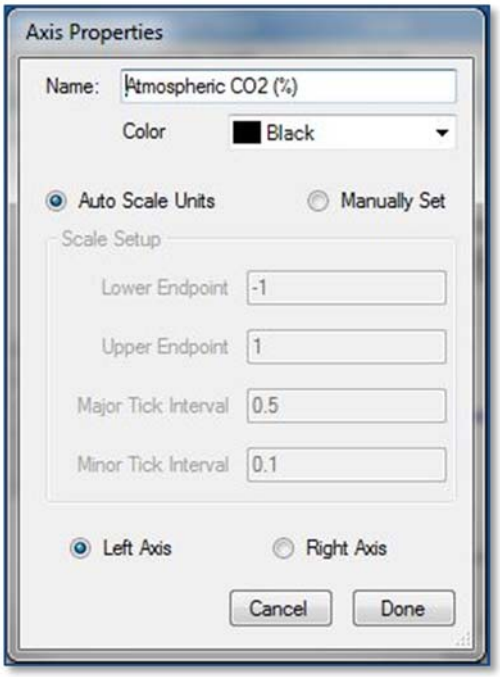


Figure 21: Example of Axis Properties – CO2

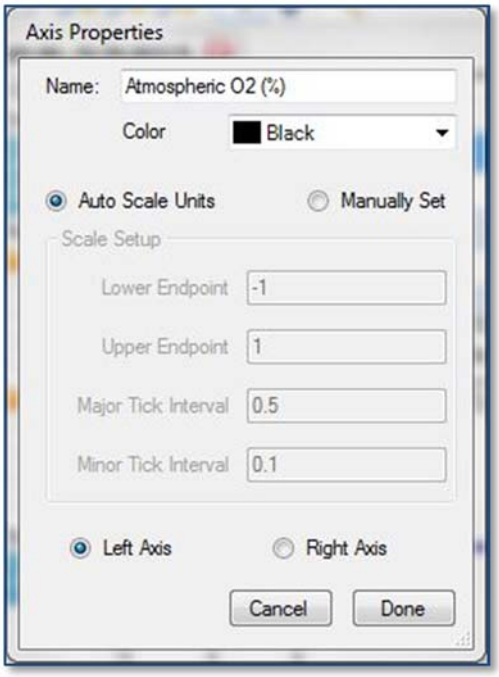


Figure 22: Example of Axis Properties – O2

Additional Features and Functions

The DAS software allows you to take control of the data collected, making it easy to utilize this data with its integrated graphical interface or any other software of your preference. You can save, open, export, graph and print the data, among other features that will allow the data to be analyzed in a variety of ways.

Saving Data

Data will be saved automatically when collecting real-time. Changes made to the file can be saved by clicking on the floppy disk icon on the *Toolbar*. If prompted, (depending on meter & application), select the desired location and filename (we recommend using meaningful filenames) and click "Save". Make sure you use the file extension ".das" at the end of the filename to format the log properly and to ensure the file can be at a later date utilizing the DAS software.

Opening Data Logs

The data logs saved in your meter's onboard storage (if equipped) or after collecting data in real time with the DAS software, can be opened for further analysis or for exporting. To open a data log, go to "File" on the main menu and select *VIEW/OPEN DATA.* Logs can also be opened by clicking on the *Open Folder* icon on the *Toolbar*.

Exporting Data

Once you have collected the necessary data, it can be exported to a spreadsheet in comma-separated values (.csv) format. The data can be opened and managed in any major spreadsheet software that accepts .csv files. To export the data to a spreadsheet, go to "File" on the main menu and select "Export Data to Spreadsheet". Select a location (Desktop is recommended for easy access) and a meaningful filename and click "Save" on the bottom right corner of the "Save As" window. Data can also be exported by clicking on the ***EXPORT DATA*** icon on the *Toolbar*

NOTE: data collected can be exported in real time or saved as a log from previous measurements. The only data that can be exported is the file that is shown on the Main Workspace in DAS. Access the data needed, display it, then export.

Saving the Graph

After you have opened the data logs required, they can be analyzed via the graph and saved as an image file (.jpg) for future reference, streamlining the process of incorporating it to any electronic document such as a report created in a word-processing program. To save the graph, go to "File" on the main menu and select "Save Graph as Image" as shown in ***Figure 23***. Select a suitable image size as shown on ***Figure 24*** and click on the "Save" button on the bottom right corner of the window. Select the desired file location and filename and save.

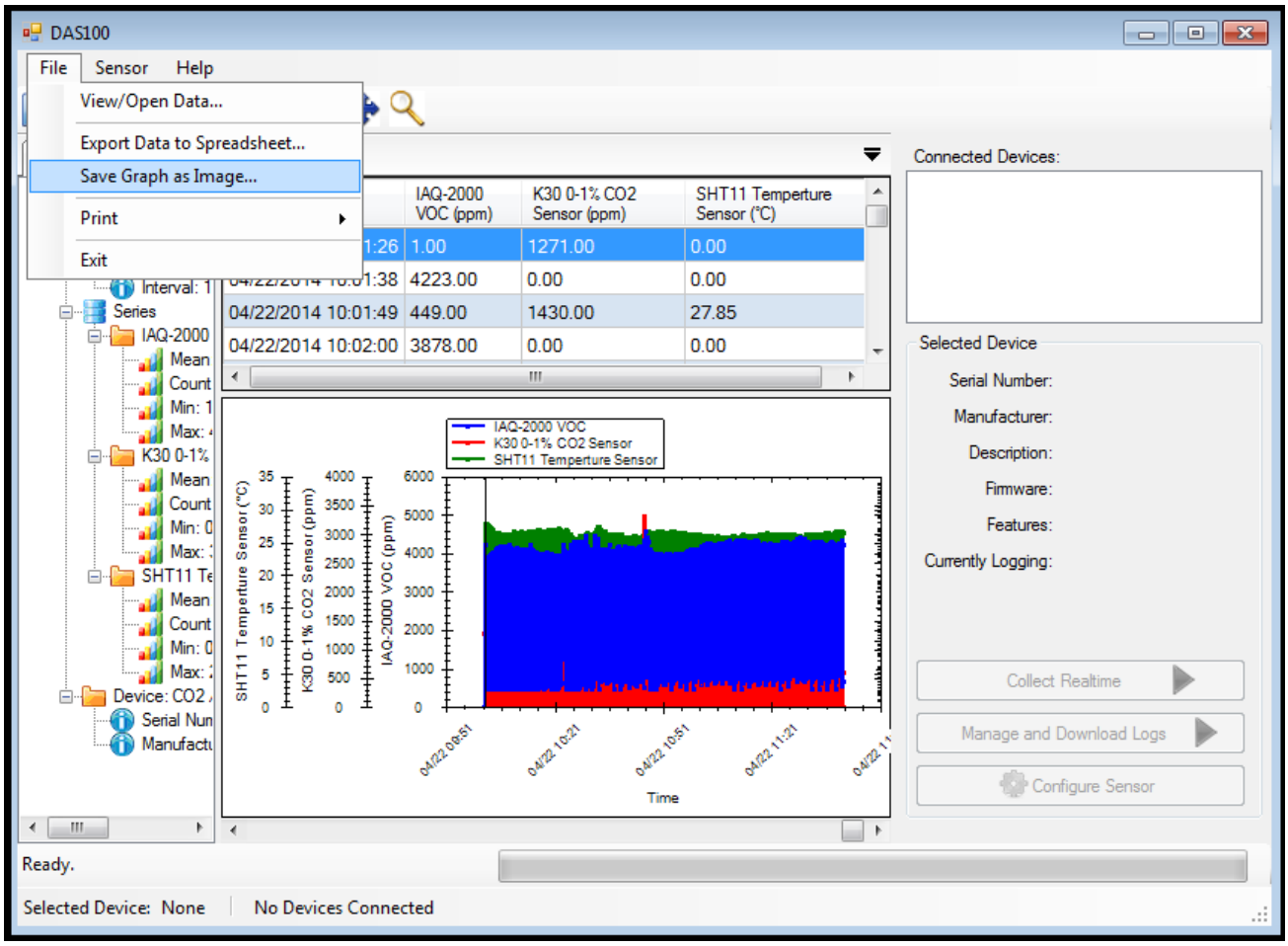


Figure 23: Save Graph.

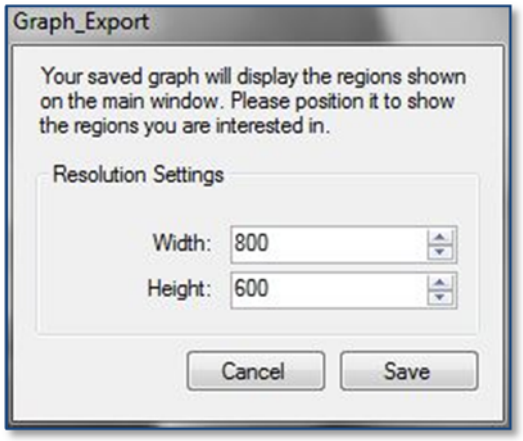


Figure 24: Save Graph.

Printing Options

The DAS software allows printing collected or saved data. Choose between printing the data series only, the graph only, or both (*Entire View*), as shown in ***Figure 25***. To print your data, go to "File" on the main menu and select "Print" and then your desired option. Select the desired printing meter, adjust the preferences as required, and print.

NOTE: DAS will need to be restarted after printing each view.

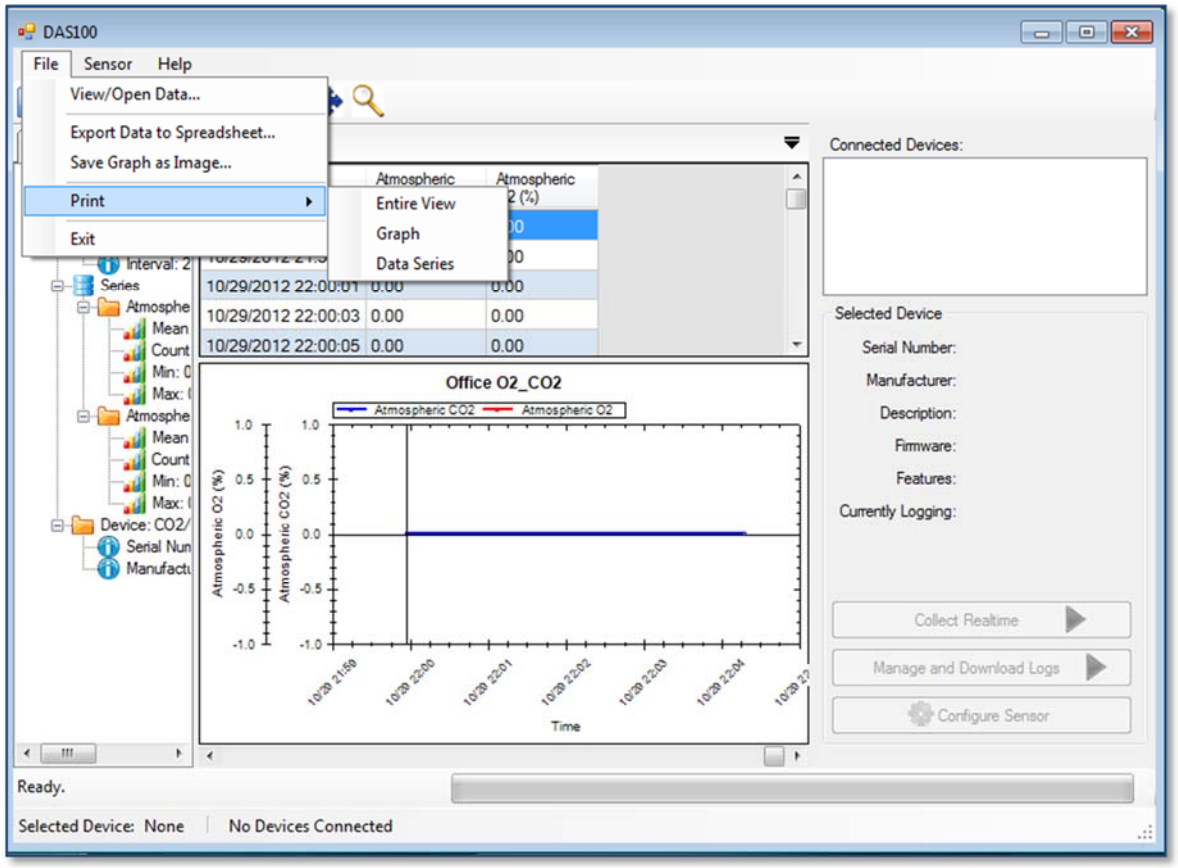


Figure 25: Printing options

Downloading Logs

You can easily download all saved data logs from your meter or sensor if it is equipped with onboard storage by connecting your meter to a computer that has the DAS software already installed and running. For more information on connecting your meter to the computer, see the *Connecting Meters* section in this manual.

In order to download saved data logs, click on the ***MANAGE AND DOWNLOAD LOGS*** button on the bottom right section of the *Sensor Management Tray*. The DAS software will start downloading all the logs saved on the onboard memory of the meter as shown in ***Figure 26***. The software will allow you to choose single or multiple logs, as desired, from all the available datasets.

After the download process is complete, you will be given the option to ***DOWNLOAD SELECTED and CLEAR*** or ***DOWNLOAD SELECTED WITHOUT CLEARING*** from the meter's onboard memory as shown in ***Figure 27***. All the logs downloaded will be saved in the default folder in the local disk (typically C:\Users\User.Name\Documents\DAS Logs for Windows 7) and will be available immediately for analysis, print or export.

After you download the desired logs, proceed to open one or more logs, as desired, following the procedure described in the *Opening Data Logs* section in this manual.
NOTE: If you open multiple logs, the program will create one working tab for each opened log above the graph section that will allow you to independently manage and evaluate your data as shown in ***Figure 28***.

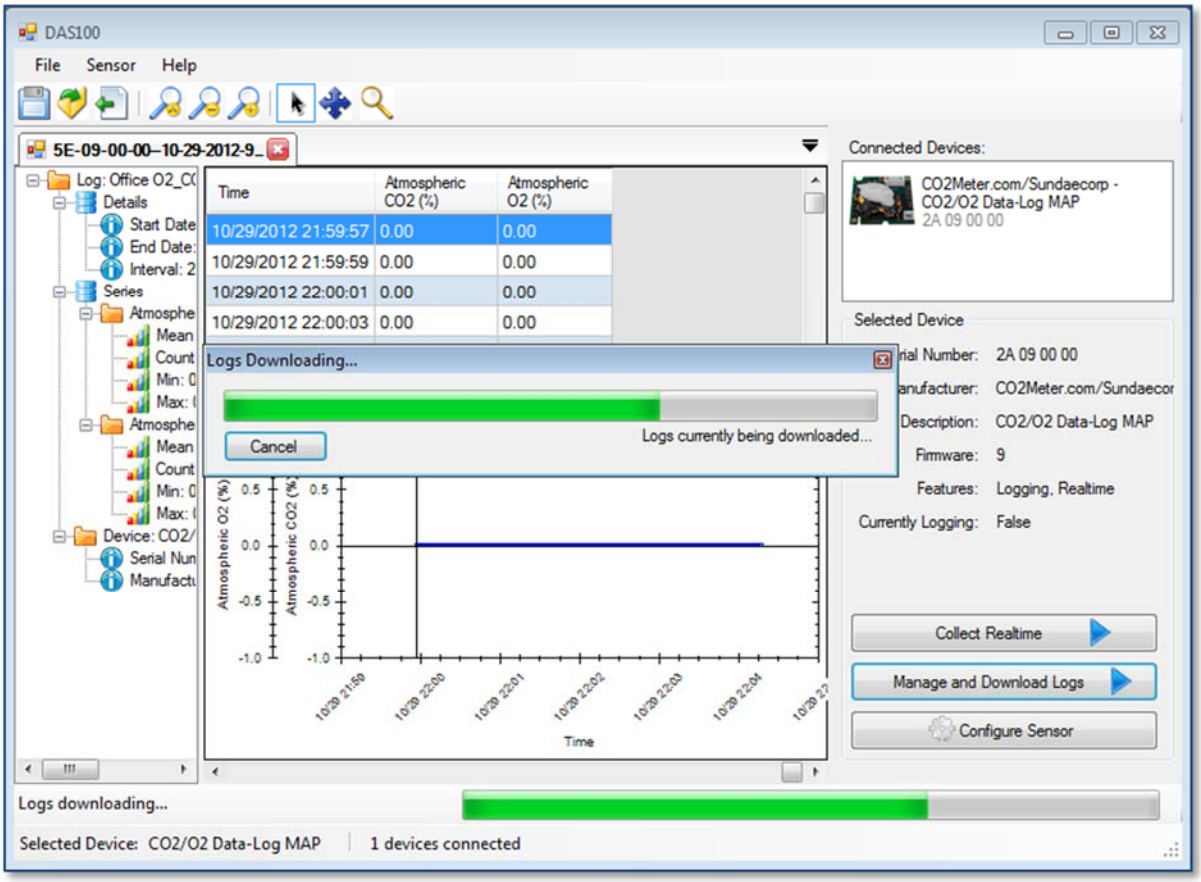


Figure 26: Downloading Logs.

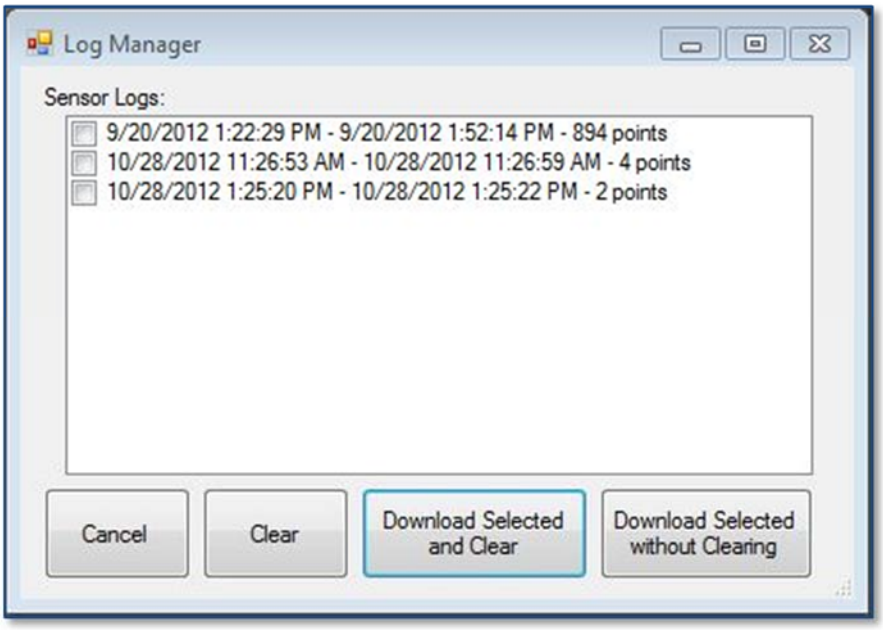


Figure 27: Log Manager.

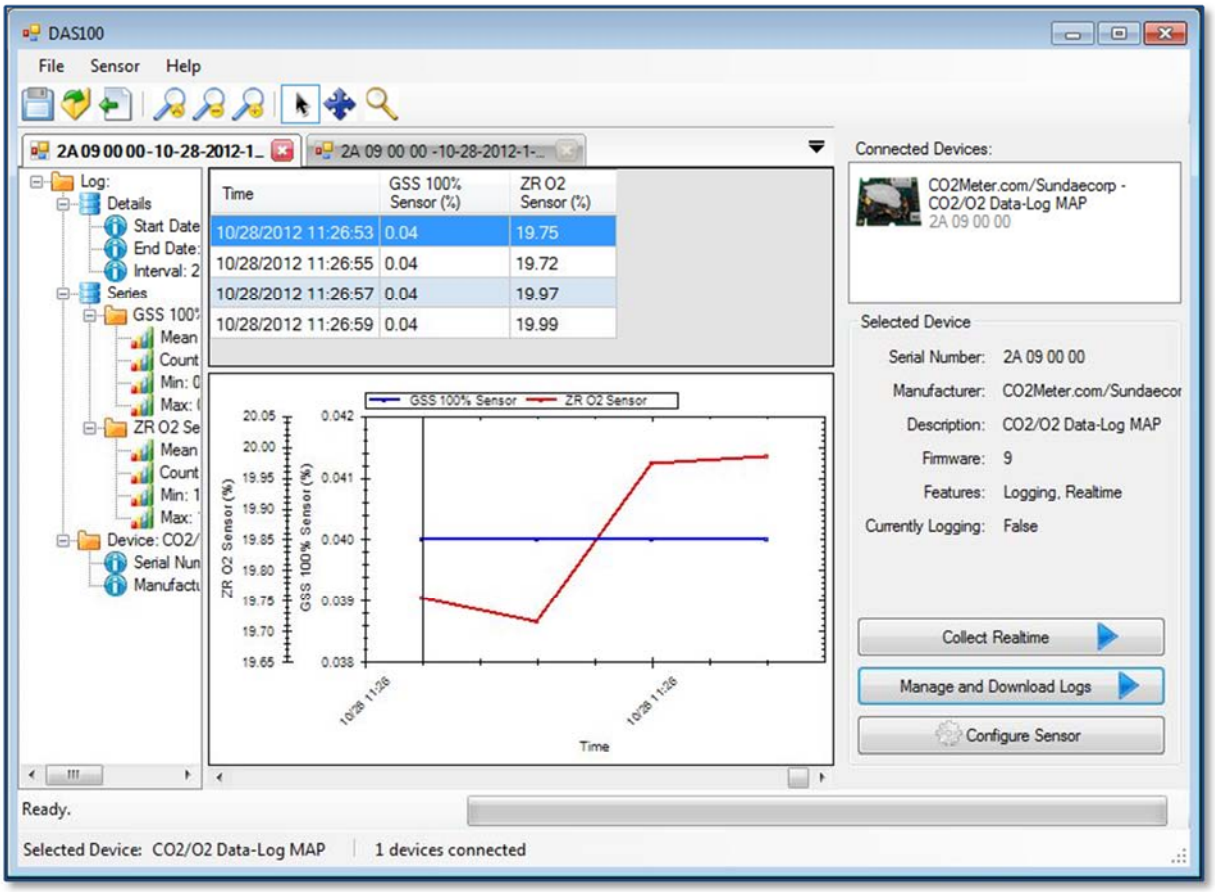


Figure 28: Multiple Working Tabs.

Log Readings and Statistics

This Report, as shown in **Figure 29**, provides details of the logged data including:

- Start and end dates
- Logging intervals
- Min / Max value of CO2 (or gas being sensed)
- Sensor information
    - Serial #
    - Name of meter (given at the time of meter detection – see *"Renaming the Meter"* section in this manual for details

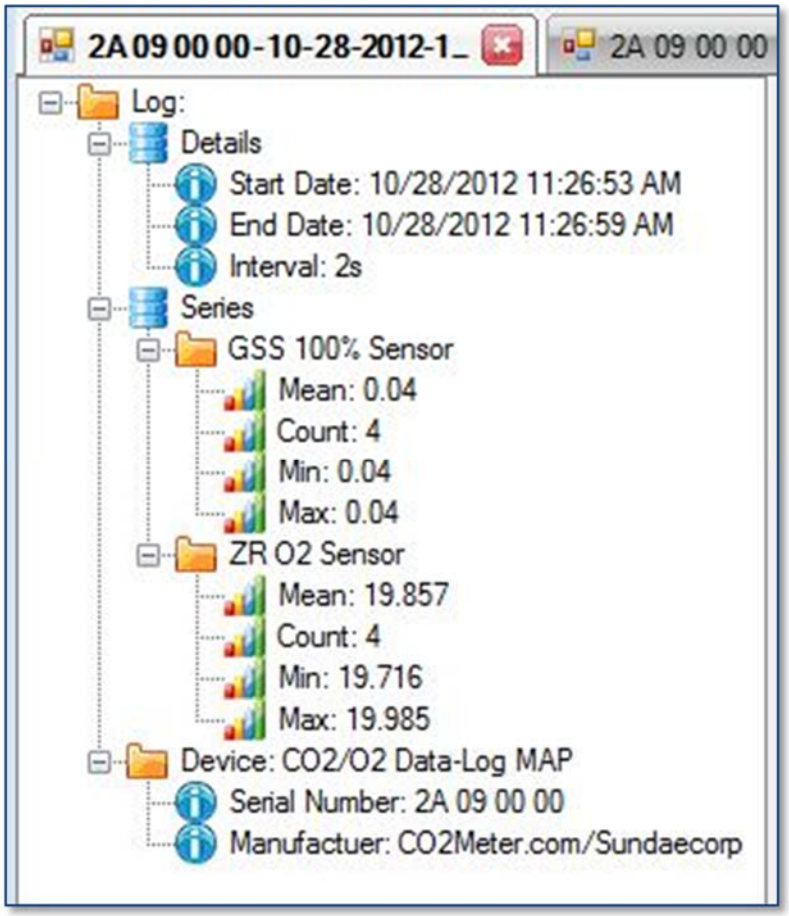


Figure 29: Data Log Information and Statistics.

Troubleshooting Guide

Symptom / Issue	Possible Cause / Resolution
Meter/Sensor is not recognized by computer	Your meter battery pack or batteries might be depleted. Connect the meter to the USB port of the computer and allow 1-2 hours of charging before reestablishing communication.
Can't find any logs from the meter on the DAS after data logging	The meter might have been disconnected while downloading logs to the computer. Connect the meter to the computer and start downloading the logs again.
The DAS software doesn't start	Your software might be out of date. Update your software by either visiting our download webpage at http://www.co2meter.com/pages/downloads or by selecting "Check for Updates" under the Help menu. Confirm the Computer meets the minimum requirements as detailed in this manual.
Collect Real-time feature doesn't work	There might be a connection problem.
Manage and Download Logs feature doesn't work	Your meter batteries might be depleted or there may be a connection problem.
Meter/Sensor is not working properly with DAS	Your meter's driver might need to be updated or reinstalled. Update the drivers by selecting the "Install Drivers" option under the *Help* menu.

Contact Us

We are here to help!

For information or technical support, please contact us.

support@co2meter.com

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